RECLAMATION

Managing Water in the West

2017 Colorado River Annual Operating Plan

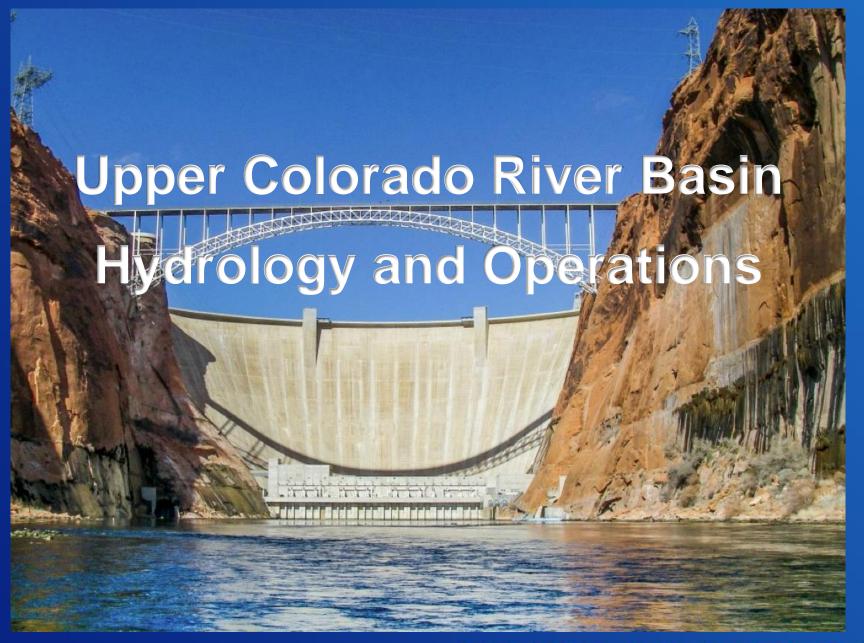
Colorado River Management Work Group First Consultation May 19, 2016



U.S. Department of the Interior Bureau of Reclamation

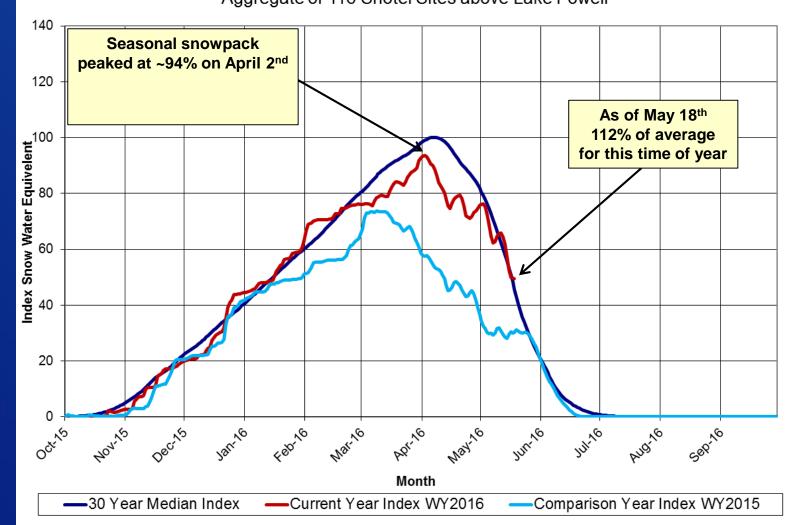
2017 Colorado River AOP First Consultation Meeting

- Welcome and Introductions Chris Cutler / Dan Bunk
- Upper Basin Hydrology and Operations Paul Davidson
- Lower Basin Hydrology and Operations Noe Santos
- 2017 AOP Review Process Chris Cutler / Dan Bunk
- Review of Draft 2017 AOP CRMWG
- Conclusion/Wrap-up
- Reminder of Future Meeting Dates



Snow Conditions

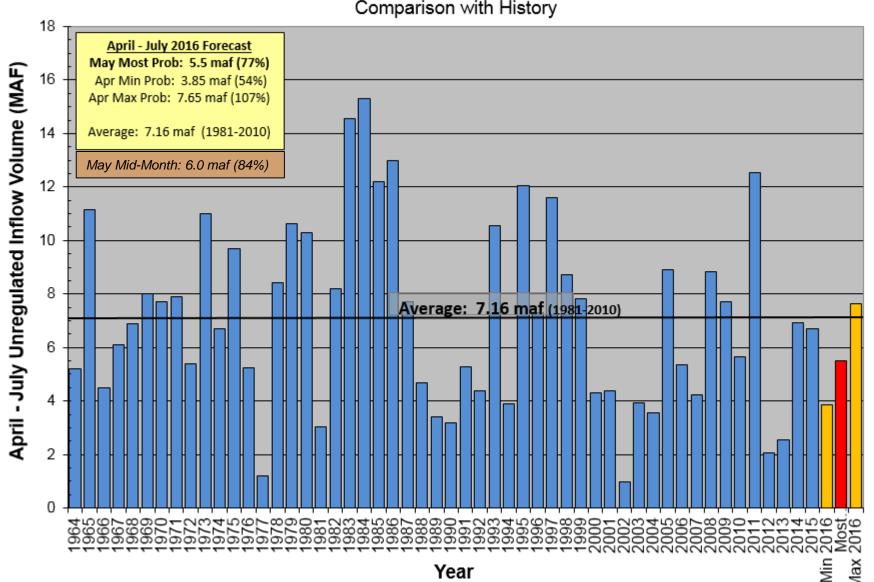


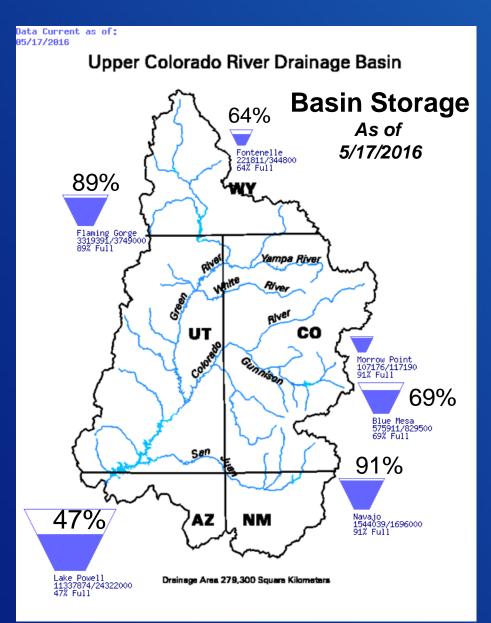


Data Provided by the Natural Resource Conservation Service



Comparison with History





April to July 2016 Forecasted Inflow Issued May 16, 2016

Reservoir	A-J Forecast (KAF)	Percent of Average ¹	
Fontenelle	650	90%	
Flaming Gorge	980	100%	
Blue Mesa	560	83%	
Navajo	525	71%	
Powell	6,000	84%	

¹ percent of average based on period 1981-2010.

Projected Operations Water Years 2016 and 2017

Lake Powell & Lake Mead Operational Table

Operational Tiers for Water Year/Calendar Year 2016¹

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹
3,700	Equalization Tier Equalize, avoid spills or release 8.23 maf	24.3	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	Upper Elevation Balancing Tier³ Release 8.23 maf;	15.5 - 19.3 (2008-2026)	(approx.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	(approx.) ²
0.575	if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf		1,145	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	15.9 11.9
3,575 Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet,	9.5	1,075	Shortage Condition Deliver 7.167 ⁴ maf	9.4	
3,525	release 8.23 maf	5.9	1,050	Shortage Condition Deliver 7.083 ⁵ maf	7.5
3,490	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	4.0	1,000	Shortage Condition Deliver 7.0° maf Further measures may be undertaken ⁷	4.3
3,370		0	895		0

Diagram not to scale

¹ Lake Powell and Lake Mead operational tier determinations were based on August 2015 24-Month Study projections and documented in the 2016 AOP.



¹ Acronym for million acre-feet

² This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

Subject to April adjustments which may result in a release according to the Equalization Tier

⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

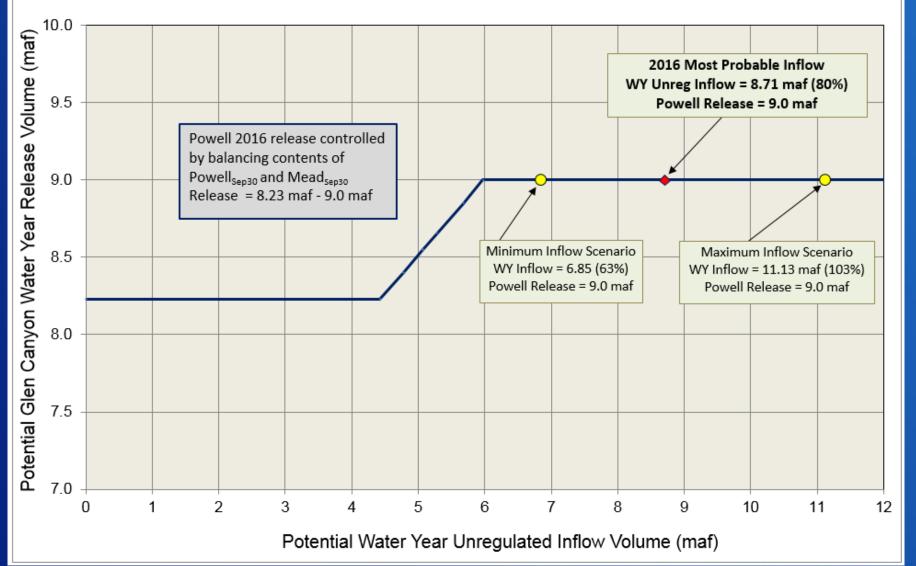
⁵ Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Ne∨ada

Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

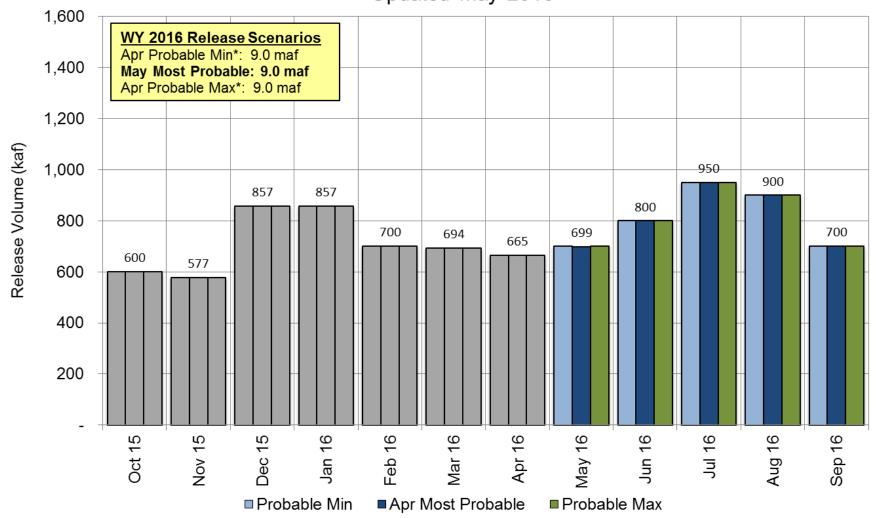
Potential Lake Powell Release Scenarios

Water Year 2016 Release Volume as a Function of Unregulated Inflow Volume based on May 2016 24-Month Study Conditions



Projected Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2016 Updated May 2016

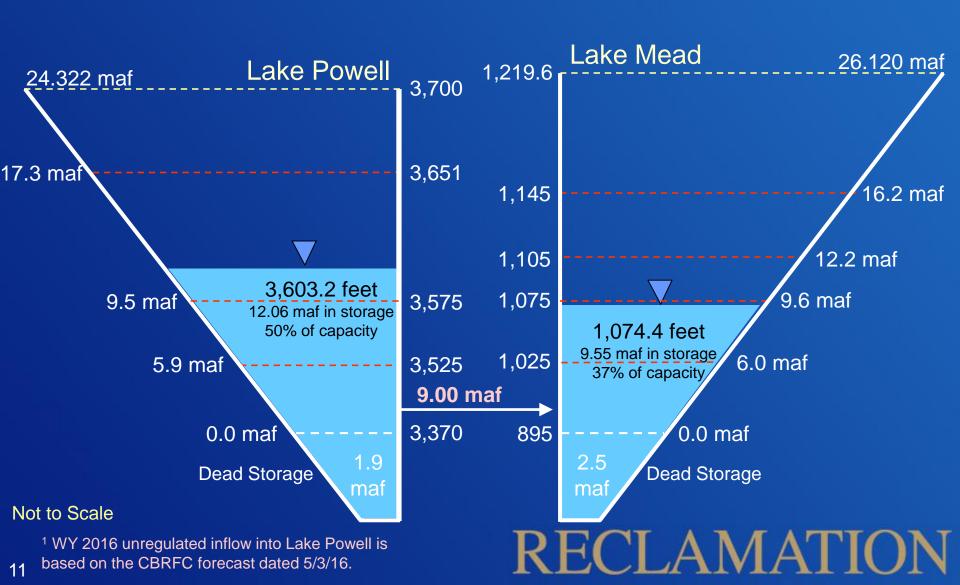


^{*} Probable Min and Max annual release volume is based on January Min and Max inflow forecasts

End of Water Year 2016 Projections

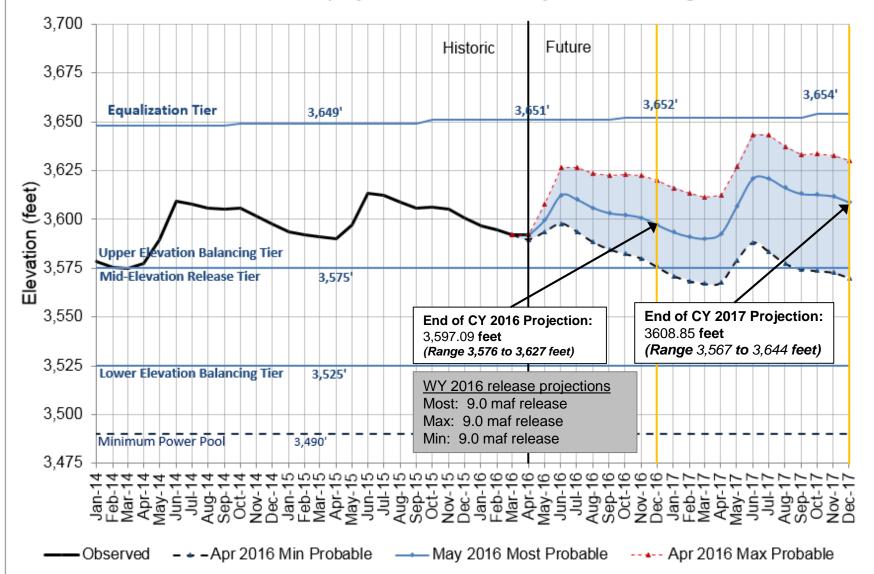
May 2016 24-Month Study Most Probable Inflow Scenario¹

Projected Unregulated Inflow into Powell¹ = 8.71 maf (80% of average)



Lake Powell End of Month Elevations

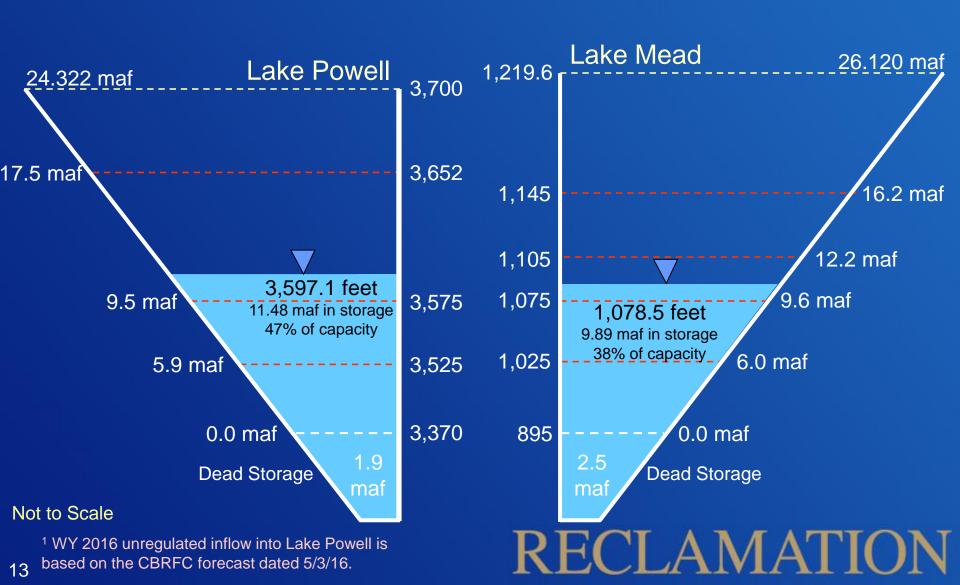




End of Calendar Year 2016 Projections

May 2016 24-Month Study Most Probable Inflow Scenario¹

Based on a 9.00 maf release pattern from Lake Powell in Water Year 2017



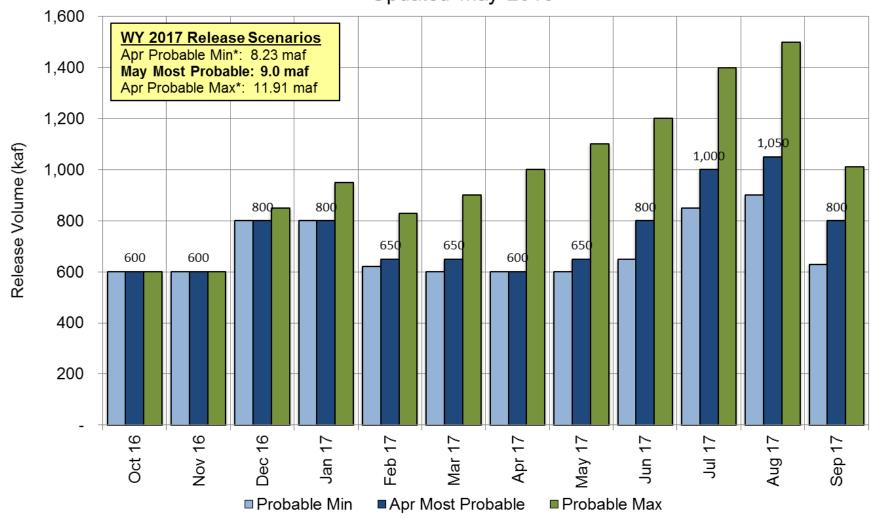
Lake Powell 2017 Operating Tier Scenarios

Based on April and May 2016 modeling

Inflow	Operating Tier
Scenario	Release Volume
Minimum	Upper Elevation Balancing
Probable	8.23 maf
Most	Upper Elevation Balancing
Probable	9.0 maf
Maximum	Upper Elevation Balancing
Probable	11.91 maf

Projected Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2017 Updated May 2016



^{*} Probable Min and Max annual release volume is based on April Min and Max inflow forecasts



Colorado River Basin Storage (as of May 18, 2016)

Current Storage	Percent Full	MAF	Elevation (Feet)
Lake Powell	47%	11.38	3,596.1
Lake Mead	37%	9.58	1,074.7
Total System Storage*	49%	29.06	NA

^{*}Total system storage was 28.54 maf or 48% this time last year

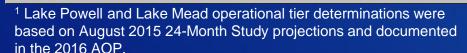
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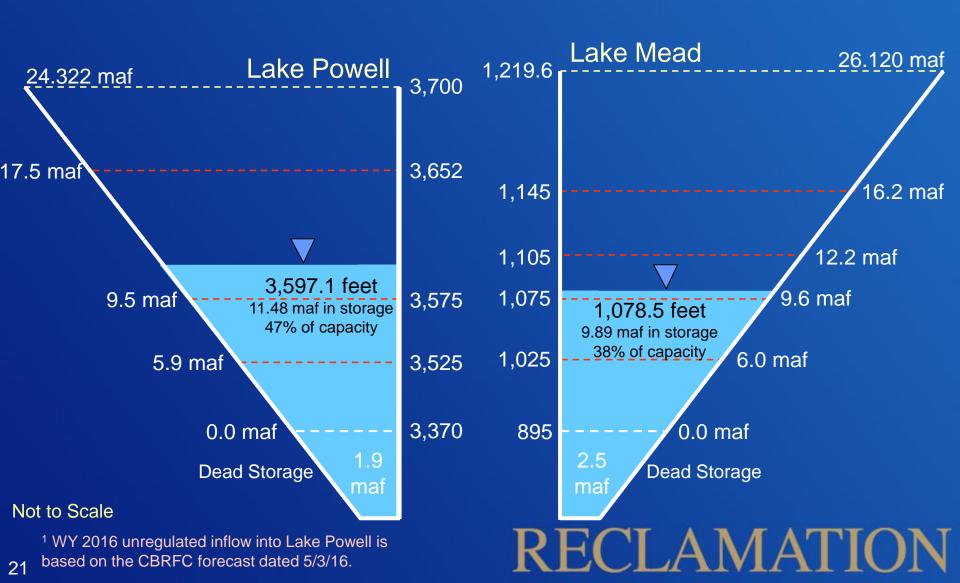
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End of Calendar Year 2016 Projections

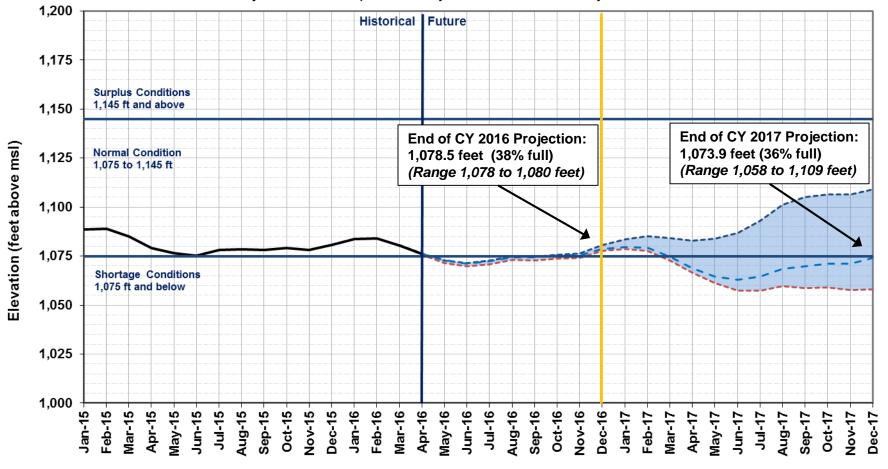
May 2016 24-Month Study Most Probable Inflow Scenario¹

Based on a 9.00 maf release pattern from Lake Powell in Water Year 2017



Lake Mead End of Month Elevations

Projections from April and May 2016 24-Month Study Inflow Scenarios



---- April 2016 Probable Maximum Inflow with Lake Powell Release of 9.00 maf in WY 2016 and 11.91 maf in WY 2017

– – May 2016 Most Probable Inflow with Lake Powell Release of 9.00 maf in WY 2016 and WY 2017

---- April 2016 Probable Minimum Inflow with Lake Powell Release of 9.00 maf in WY 2016 and 8.23 maf in WY 2017

—— Historical Elevations

Lower Basin Side Inflows – WY/CY 2016^{1,2} Intervening Flow from Glen Canyon to Hoover Dam

M	onth in WY/CY 2015	5-Year Average Intervening Flow (KAF)	Observed Intervening Flow (KAF)	Observed Intervening Flow (% of Average)	Difference From 5-Year Average (KAF)
	October 2015	69	118	171%	49
Ι.	November 2015	56	41	73%	-15
CAL	December 2015	54	43	79%	-12
HISTORICAL	January 2016	62	90	145%	28
HIST TSH	February 2016	73	81	111%	8
	March 2016	55	31	56%	-24
L	April 2016	53	69	130%	16
	May 2016	37			
	June 2016	21			
	July 2016	78			
FUTURE	August 2016	124			
냚	September 2016	112			
	October 2016	69			
	November 2016	56			
	December 2016	54			
	WY 2016 Totals	795	844	106%	50
	CY 2016 Totals	795	822	103%	28

¹ Values were computed with the LC's gain-loss model for the most recent 24-month study.



² Percents of average are based on the 5-year mean from 2011-2015.

YAO Operations Update

Brock Reservoir and Senator Wash
 2016 YTD accumulated storage¹

-Brock 65,916 AF

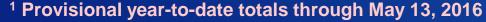
-Senator Wash 24,954 AF



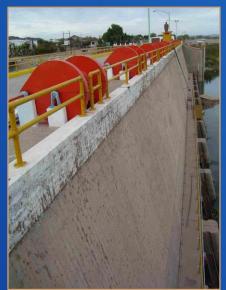
Excess Flows to Mexico

2016 YTD total²

1,389 AF



² Provisional year-to-date total through May 16, 2016



YAO Operations Update

- Pumped drainage return flows from the Wellton-Mohawk Irrigation and Drainage District
 - Flow at station 0+00 on the Main Outlet Drain from January through March 2016 was 20,300 AF at 2,592 ppm
- Provisional drainage Flows to the Colorado River
 - From the South Gila Drainage Wells
 January through April 2016 was
 6,800 AF at 1,714 ppm
 - From the Yuma Mesa Conduit January through April 2016 was 0 AF

